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(54) AN IMPROVED ROOFING TILE

(71) We, REDLAND ROOF TILES LIMITED (formerly REDLAND TILES LIMITED), a British Company, of Redland House, Castle Gate, Reigate, Surrey, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The invention relates to roofing tiles.

It is known to make individual roofing tiles of transparent plastics material, and to fit these between roofing tiles of non-transparent plastics material. However, this has the disadvantage that a very large amount of costly plastics material is used and that the parts of the roof covered by the roofing tile, e.g. the battens, are visible from outside; the appearance is not aesthetically pleasing.

An object of the present invention, therefore, is to devise an improved roofing tile which allows light to enter into the interior of the roof and which preferably at the same time conceals those parts of the roof structure lying under the roofing tiles.

The invention provides a roofing tile having a roof covering part, a lateral grooving comprising a plurality of grooves and an overlapping part which, in use, overlaps and engages the lateral grooving of an adjacent interlocking tile, characterized in that the roof covering part consists partly of a transparent material and partly of a non-transparent material. In this way, light is able to enter into the interior of the roof. An advantage of the invention is that it achieves an essential economy over roofing tiles which consist solely of transparent plastics material. Advantageously the roofing tile has a central ridge, and a support rib.

The transparent part is advantageously rectangular in form, though it may also be rounded off at the four corners. Such elements are simple to manufacture, transport and handle.

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It is particularly advantageous if the transparent part is arranged in the centre of the roofing tile in such a way that, in use, roof battens which support the tile are covered by the non-transparent part. In this way, sufficient light is able to enter into the interior of the roof, while the roof maintains an aesthetically pleasing appearance.

In the manufacture of two-piece tiles, it has been found to be advantageous if both the non-transparent part and the transparent part consist of plastics material. The plastics elements are simple to manufacture and are also easily connected to one another.

It is also favourable for manufacture if the transparent parts of the two-piece tiles are flat. These parts are particularly simple to produce and allow an undistorted view, as through a window.

It is particularly advantageous, however, if the transparent part has a central ridge. The dimensions of the ridge may be such that the transparent and non-transparent parts are precisely matched to one another. In this case, the connection of the two parts may be effected very simply and the tile has a uniform appearance.

Instead of the central ridge there may also be provided in the transparent part a round or elliptical dome arranged centrally in the transparent part. These tiles are also suitable as an ingress for light.

For the firm connection of the two parts of the tile, it is advantageous for there to be provided on one part of the tile an offset into which the other part can be inserted. In this way it is again very simple to connect the two parts to one another.

Advantageously, the transparent and non-transparent parts are moulded separately. With the provision of an offset, e.g. on the

non-transparent part, the transparent part can be inserted into the offset and then bonded. The connection is very simple. It is also advantageous for the two parts to be welded, which gives particularly good durability.

The procedure may also, however, be such that a premoulded part, e.g. the transparent part, is placed in a mould and then the material of the other, non-transparent part is injection-moulded around it. This method gives a particularly good connection of the two parts.

A particularly advantageous embodiment of the invention is achieved when walls perpendicular to the plane of the tile and running transversely of and longitudinally in the direction of the slope of the roof, are provided at the aperture left for accommodation of the transparent part, these serving to receive a displaceable transparent cover. The cover may easily be replaced in the event of damage.

Advantageously, the transparent cover is arranged displaceably on the walls running in the direction of the slope of the roof. This displacement can be carried out easily from the interior of the roof with the aid of a handle.

When the transparent cover contacts firmly with two walls against the two transverse walls serving to receive the cover, the cover firmly closes off the aperture in the tile. Air cannot flow through. On the other hand, when the transparent cover is displaced upwards in such a way that only the handle contacts the upper transverse wall of the aperture, the air is able to pass freely. As a result, the transparent part of the roofing tile may advantageously also be used for ventilation.

The surface of the transparent cover may be flat. In order to provide a better run-off of rainwater, however, a rounded surface is advantageous.

It has been found to be particularly advantageous if a support rib and a double rib are provided at the foot end of the tile. Advantageously, the double rib is in this case somewhat shallower than the support rib. This design provides a firm connection of the roofing tiles one above the other. Any unevenness in the surface is taken up. As a result of the good air swirl which forms, there is achieved a very efficient precipitation of water, driving snow, dust and like matter.

Some specific examples of roofing tiles according to the invention will be described with reference to the accompanying drawings in which:—

Figure 1 is a plan view of the top-side of a roofing tile with a transparent flat part inserted;

Figure 2 is a view of the foot end of the

tile in accordance with Figure 1;

Figure 3 is a section through the roofing tile taken along the line A-B in Figure 1;

Figure 4 is a plan view of the top-side of a roofing tile with a transparent part having a central ridge;

Figure 5 is a section through the transparent tile with central ridge, along the line E-F of Figure 4;

Figure 6 is a section through the roofing tile along the line C-D of Figure 4;

Figure 7 is a plan view of the top-side of a roofing tile with a transparent part having a dome;

Figure 8 is a section through the roofing tile taken along the line K-L of Figure 7;

Figure 9 is a schematic representation of the connection between the transparent part and the non-transparent part;

Figure 10 is a plan view of the top-side of the roofing tile with perpendicular walls serving to receive a transparent cover;

Figure 11 is a plan view of the top-side of the roofing tile, with the transparent cover in place;

Figure 12 is a section along the line G-H in accordance with Figure 11;

Figure 13 is a section similar to Figure 12, in which the transparent cover has been displaced;

Figure 14 is a front view of the roofing tile with a transparent cover in place;

Figure 15 is a view similar to Figure 14, in which the cover has a rounded surface.

In Figure 1, a roofing tile has a longitudinally extending central ridge 1. Parallel to the latter there are two flat areas 2 and 3, which serve as the main water-guiding surface.

Adjacent to the flat part 3 of the surface is the overlapping ridge 4 and adjacent to the flat part 2 of the surface is the lateral grooving 5. When the roof has been laid the ribs of the overlapping ridge 4 engage in grooves in the lateral grooving 5 of the adjacent tile (Figure 2).

To the head fillet 6 of the roofing tile there are connected suspension lugs 7 and 8. At the foot end of the tile there is a support rib 9 which runs perpendicularly to the longitudinal axis of the tile and which extends over the whole covering width of the tile, that is, excluding the lateral grooves 5 and overlapping ridge 4. Parallel to said rib, there is a double rib 11 which likewise extends over the same width of the tile and which is shallower than the support rib 9, as shown in Figure 3.

Each roofing tile is suspended on a batten by means of the suspension lugs 7 and 8, the support rib 9 of the upper tile resting on the top-side of the tile underneath.

On the underside of each roofing tile there are provided two projections 13 and 130

14, each of which has a hole. In these holes there may be fastened storm clamps (not shown). By means of these storm clamps, the tile on top is held firmly on the tile underneath even in the case of a strong wind. As a result of the rib 9 and the double rib 11, a good air swirl is created. In this way water, snow or dust is precipitated and cannot enter into the interior of the roof.

In Figure 1 it can be seen that the transparent part 17 is arranged in the roofing tile. The dimensions of this part 17 are such that nothing can be seen of the battens lying underneath. The central ridge 1 terminates at end edges 15, and the central ridge 1 is connected to the transparent flat part 17 by means of two closure plates 16.

In Figure 3, the section along line A-B of Figure 1 shows the transparent flat part 17. The central ridge 1 is connected to the flat part 17 by the closure plate 16.

Figure 4 shows another type of transparent part 17. It includes a central ridge 18 which corresponds exactly in size to the central ridge 1. The projections 13 and 14 with holes for the attachment of storm clamps are arranged next to the transparent part.

A section through the transparent part 17 with a central ridge 18 along the line E-F of Figure 4 is shown in Figure 5. The section along line C-D of Figure 4 illustrates, in Figure 6, how the central ridge 18 of the transparent part 17 is connected to the central ridge 1 of the non-transparent part. The offset 20 has *inter alia* the advantage that the connection is very firm.

Figures 7 and 8 show a transparent part which has a round dome 19. The section in Figure 8 along line E-F of Figure 7 shows that the central ridge 1 of the non-transparent part is connected to the transparent part 17 by means of the closure plates 16, as in Figure 3.

For simplified connection of the two parts of the roofing tile, the edge of the non-transparent part is provided with an offset 20 into which the transparent part 17 is inserted. From Figure 9 it can be seen that the connection of the two parts is in this way greatly simplified.

Figures 10 to 15 show an embodiment in which a transparent cover can be arranged in different positions. The aperture for accommodation of the transparent cover is in accordance with Figure 10 provided with four perpendicular walls of which two (21) are arranged transversely while the other two (22) run longitudinally in the direction of the slope of the roof.

A roofing tile with a transparent cover 23 in place is shown in Figure 11. On the inside of the transparent cover 23 there is

provided a handle 24 by means of which the transparent cover 23 can be displaced in the direction of the slope of the roof. In this event the perpendicular walls of the transparent cover 23 slide along the perpendicular walls 22 unning in the direction of the slope of the roof. The arrangement in which the cover slides and is firmly guided is of known type and is therefore not shown.

Figure 12 shows a section along line H-G of Figure 11. On the underside of the transparent cover 23 there are arranged three walls 25, 26 and 27. From Figure 12, it can be seen that the walls 25 and 26 fit firmly against the walls 21 serving to receive the transparent cover 23. The cover is therefore seated firmly, and no air can pass.

A different position of the cover 23 is shown in Figure 13. With the aid of the handle 24, the cover is displaced until the handle 24 contacts the wall 21. Air is now able to flow through under the cover. The path of the air is shown by the broken line in Figure 13. In this way, ventilation of the roof is achieved.

Figure 14 shows a front view of the roofing tile shown in Figure 11. The transparent cover 23 is in place on the walls 22. The sliding arrangement in which the transparent cover 23 can be displaced is not shown.

Figure 15 shows a transparent cover 23 with rounded surface 28.

#### WHAT WE CLAIM IS:—

1. A roofing tile having a roof covering part, a lateral grooving comprising a plurality of grooves and an overlapping part which, in use, overlaps and engages the lateral grooving of an adjacent interlocking tile, characterized in that the roof covering part consists partly of a transparent material and partly of a non-transparent material.

2. A roofing tile as claimed in claim 1 further comprising a central ridge, and at least one support rib.

3. A roofing tile as claimed in claim 1 or claim 2 characterized in that the transparent part is rectangular.

4. A roofing tile as claimed in claim 3, characterized in that all four corners of the transparent part are rounded off.

5. A roofing tile as claimed in any one of claims 1 to 4, characterized in that the transparent part is arranged in the middle of the roofing tile, the arrangement being such that, in use, roof battens which support the tile are covered by the non-transparent part.

6. A roofing tile as claimed in any one of claims 1 to 5, characterized in that the transparent part is flat.

7. A roofing tile as claimed in any one

of claims 1 to 5, characterised in that the transparent part has a central ridge.

8. A roofing tile as claimed in any one of claims 1 to 5, characterized in that the transparent part has a dome.

9. A roofing tile as claimed in any one of claims 1 to 8, characterized in that the transparent part and the non-transparent part consist of plastics material.

10. A roofing tile as claimed in any one of claims 1 to 9, characterized in that on one of the two parts there is provided an offset into which the other part can be inserted.

11. A roofing tile as claimed in any one of claims 1 to 10, characterized in that the non-transparent part and the transparent part are bonded to one another.

12. A roofing tile as claimed in any one of claims 1 to 10, characterized in that the non-transparent part and the transparent part are welded to one another.

13. A roofing tile as claimed in any one of claims 1 to 10, characterized in that the transparent part is placed in a mould and material for the non-transparent part is injected round it.

14. A roofing tile as claimed in any one of claims 1 to 13, characterized in that at the aperture for accommodation of the transparent part there are provided walls perpendicular to the plane of the tile and running transversely of and longitudinally in the direction of the slope of the roof, said walls serving to receive a displaceable transparent cover.

15. A roofing tile as claimed in claim 14, characterized in that the transparent

cover can be displaced along the walls running in the direction of the slope of the roof.

16. A roofing tile as claimed in claim 14 or claim 15, characterized in that two walls of the transparent cover firmly contact two walls of the non-transparent part.

17. A roofing tile as claimed in claim 14 or claim 15 characterized in that when the transparent cover is displaced, a handle provided on the cover contacts a wall of the non-transparent part.

18. A roofing tile as claimed in any one of claims 14 to 17, characterized in that the transparent cover has a flat surface.

19. A roofing tile as claimed in any one of claims 14 to 17, characterized in that the transparent cover has a rounded surface.

20. A roofing tile as claimed in any one of claims 2 to 19, characterized in that at the foot end of the tile there are arranged a support rib and a double rib in spaced parallel relationship.

21. A roofing tile as claimed in claim 20, characterized in that the double rib is shallower than the support rib.

22. A roofing tile substantially as hereinbefore described with reference to and as shown in either Figures 1 to 3 or Figures 4 to 6 or Figures 7 and 8 or Figures 10 to 14 or Figure 15 of the accompanying drawings.

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Fig. 1.

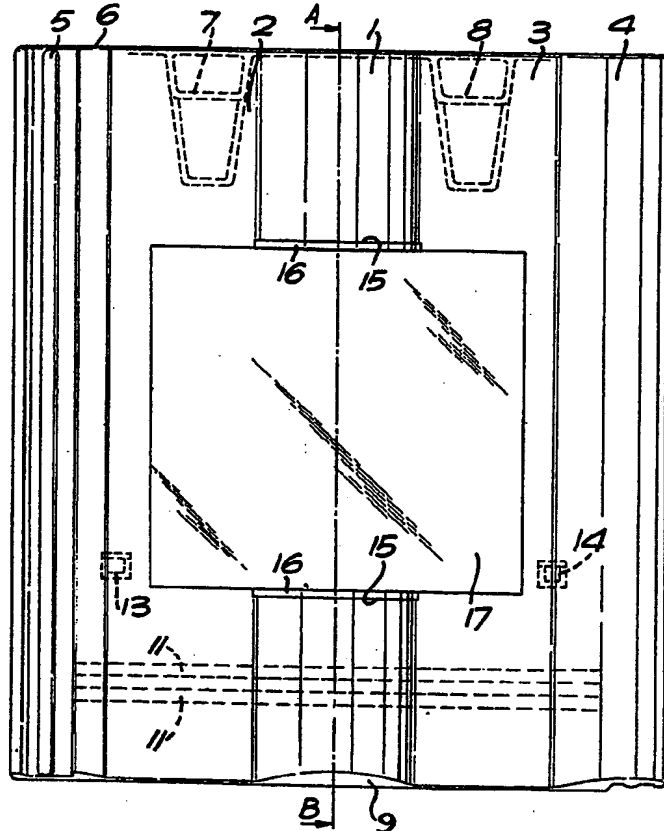


Fig. 3

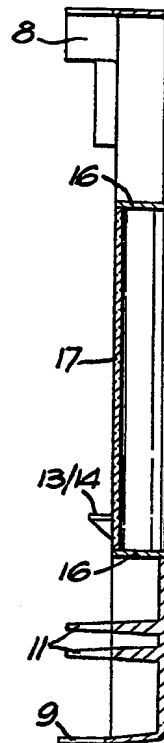


Fig. 2.

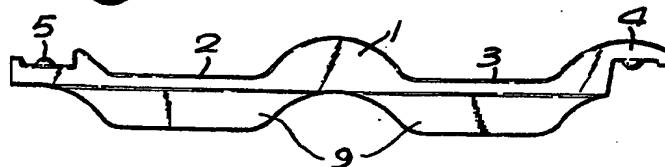


Fig. 4.

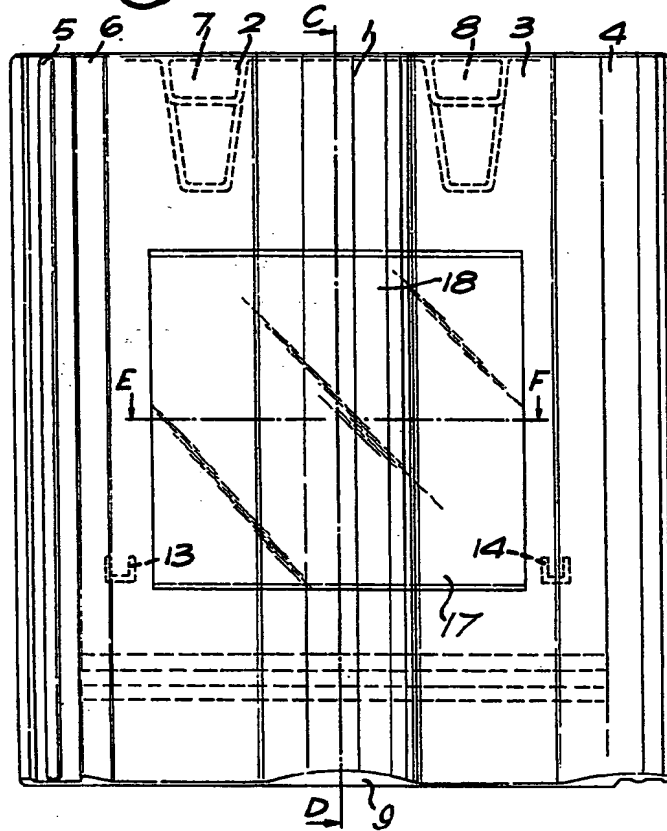


Fig. 6.

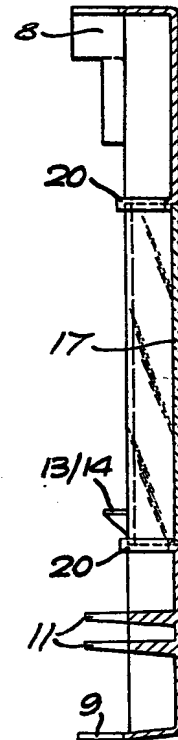


Fig. 5.



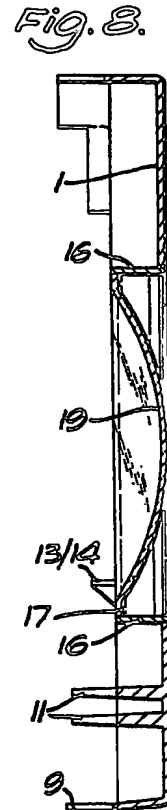
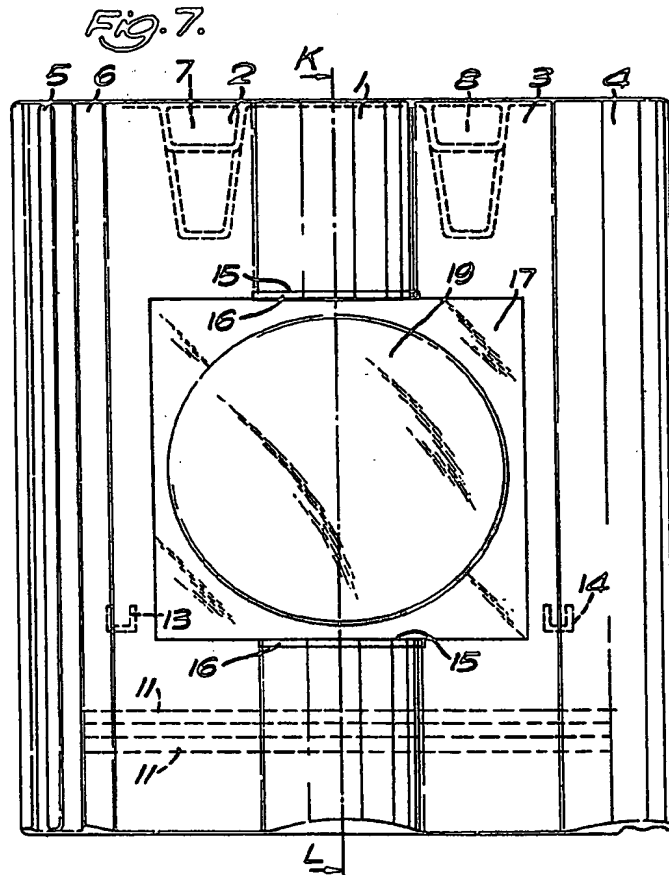


FIG. 9.



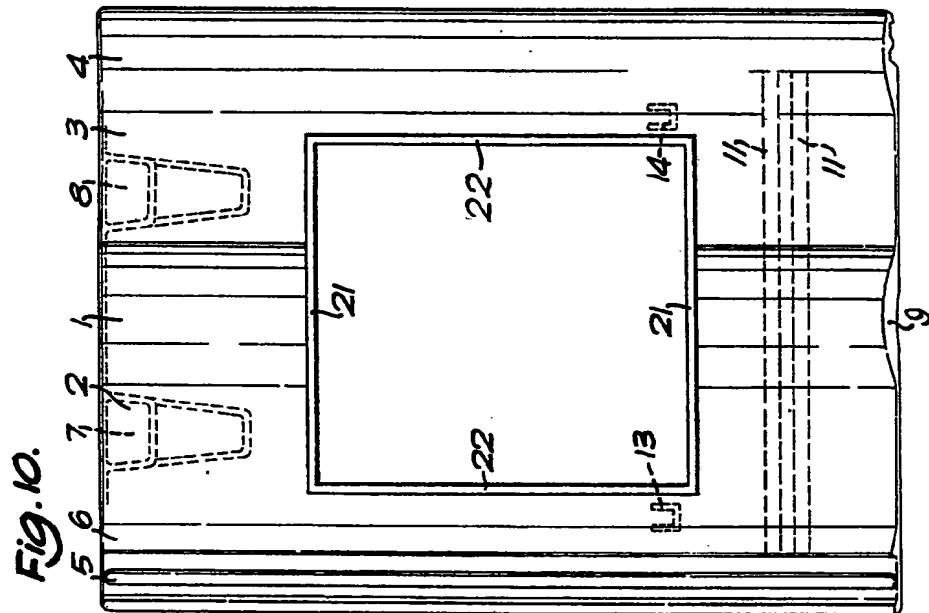
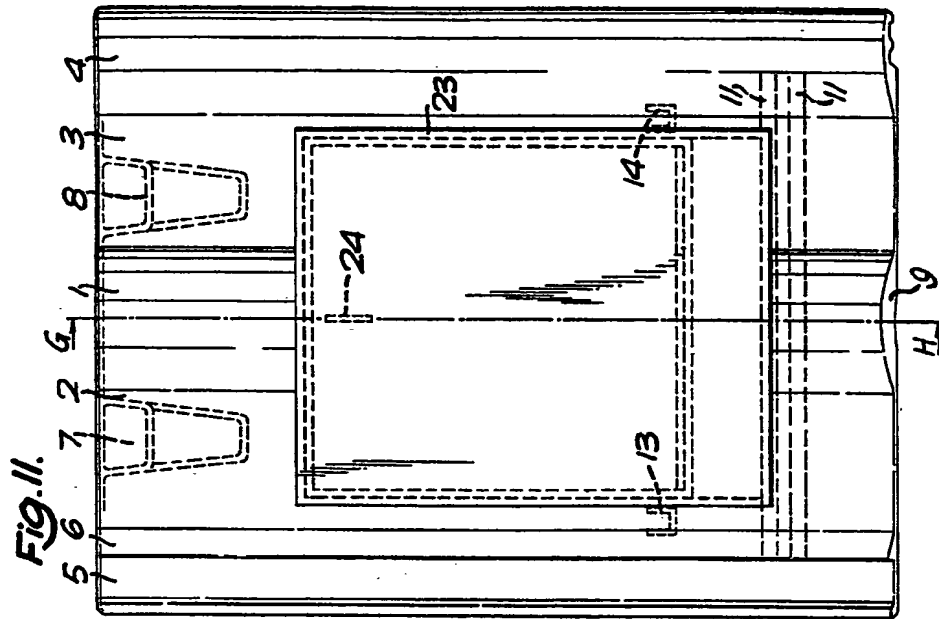




Fig.12.

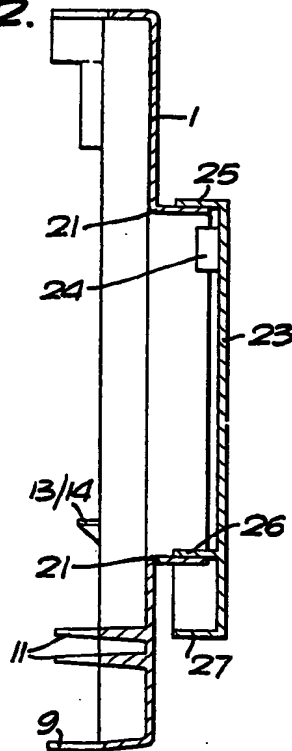


Fig.13.

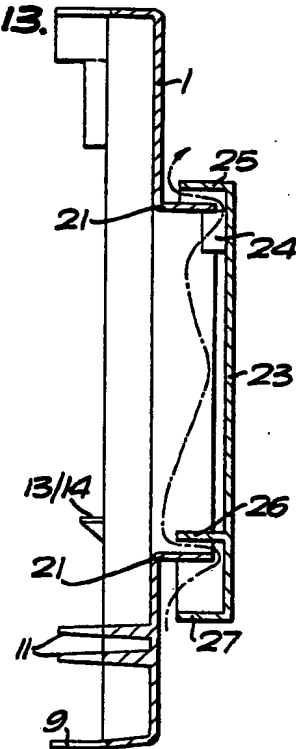


Fig.14.

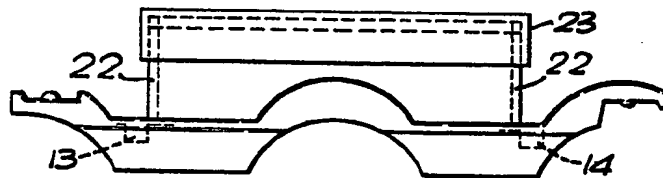


Fig.15.

